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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

BENSON, WALTER

ART UNIT PAPER NUMBER

2858

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/030,104	YAMAOKA, SHUJI	
	Examiner	Art Unit	
	Walter Benson	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed, 10/28/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 2-4,6,7,9,19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,8,10-18 and 21-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5/03/02 . 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1, 5, 8, 10-18, and 21-29 in Paper No. 10/28/03 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 2-4, 6-7, 9, and 19-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 10/28/04.

Claim Objections

1. Claims 8 and 29 are objected to because of the following informalities:
claim 8, line 2, --prove—appears to be “probe”
claim 29, line 8, --rang—appears to be “range”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 8, 10, 12-18, and 21, 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crook et al. (US Patent No. 5,254,953 and Crook hereinafter) in view of Chatterjee et al. (US Patent No. 6,111,414 and Chatterjee hereinafter).

4. As to claims 1 and 18, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

capacitive coupling means to be capacitively coupled with the first terminal in a non-contact manner to provide a coupling capacitance there between (106, Fig. 6A; col.10, lines 47-48);

probe means connected to a second lead wire and to be contact with the second terminal (540, Fig. 6A; col. 10, lines 17-19);

signal inputting means for inputting an inspection signal including an AC component into one of the first and second lead wires (104, Fig. 6A; col. 7, lines 3-4);

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signal detecting means for detecting an output of the inspection signal at the other of the first and second lead wires (col. 10, lines 23-29.

Crook did not expressly disclose:

an inductive element connected to said capacitive coupling means to form a resonance circuit in conjunction with the capacitance yielded by the capacitive coupling means;

a first lead wire connected to the inductive element [claim 1];

previous to the step of applying an inspection signal, determining a resonance frequency for a pattern wire between first and second terminals of a given reference board by applying an inspection signal while changing the frequency of the inspection signal;

in the step of applying an inspection signal, applying the inspection signal to one of the first and second lead wires with using the determined resonance frequency as a frequency thereof [claim 24];

in the step of determining a resonance frequency, changing the frequency of the inspection signal for the reference board within a given range having a center frequency defined by a standard frequency determined based on the constant of the inductive element [claim 25];

in the step of applying an inspecting signal, changing the frequency of the inspection signal for the board as an inspection object within a given range having a center frequency defined by the frequency determined in the step of determining a resonance frequency [claim 26];

which further includes means for changing the frequency of the inspection signal [claim 27];

a computer-readable record medium storing thereon a computer program which achieves a continuity inspection method [claim 28]

Nonetheless, these features are well known in the art and would have been an obvious modification of the system disclosed by Crook, as evidenced by Chatterjee.

In an analogous art, Chatterjee discloses a system for testing interconnects in multi-chip modules having:

an inductive element connected to said capacitive coupling means to form a resonance circuit in conjunction with the capacitance yielded by the capacitive coupling means (col. 3, lines 66-67 and col. 5, line 1) to provide a relatively high quality factor;

a first lead wire connected to the inductive element [claim 1] (col. 4, lines 1-3) to couple the resonant circuit for input or output functions;

previous to the step of applying an inspection signal, determining a resonance frequency for a pattern wire between first and second terminals of a given reference board by applying an inspection signal while changing the frequency of the inspection signal (col. 5, lines 64-67) to generate a test signal in the resonant circuit;

in the step of applying an inspection signal, applying the inspection signal to one of the first and second lead wires with using the determined resonance frequency as a frequency thereof [claim 24] (col. 6, lines 11-17) for determining the existence of a defect;

in the step of determining a resonance frequency, changing the frequency of the inspection signal for the reference board within a given range having a center frequency defined by a standard frequency determined based on the constant of the inductive element [claim 25] (col. 6, lines 33-42) to provide for resonant frequency having a steep slope;

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in the step of applying an inspecting signal, changing the frequency of the inspection signal for the board as an inspection object within a given range having a center frequency defined by the frequency determined in the step of determining a resonance frequency [claim 26] (col. 6, lines 47-53) to allow for desirable quality factor;

which further includes means for changing the frequency of the inspection signal [claim 27] (col. 6, lines 59-67) to provide for sufficient Q factor to detect the defective interconnect;

a computer-readable record medium storing thereon a computer program which achieves a continuity inspection method [claim 28] (col. 8, lines 31-41).

Given the teaching Chatterjee, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Crook by employing the well known or conventional features of continuity testing, such as disclosed by Chatterjee, in order generate a test signal to be applied to an interconnect to test for defects and for the purposes discussed above.

5. As to claim 8, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the probe means include, a probe connected to the second lead wire, the probe connected directly and detachably to the second terminal in the form of a resistance (col. 10, lines 25-27).

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6. As to claims 10 and 21, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the inspection signal is an AC signal (col. 10, lines 27-29).

7. As to claims 12 and 23, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the board includes a plurality of pattern wire; formed thereon, the pattern wires each having first and second terminal groups, wherein the continuity inspection apparatus further includes selecting means for selecting the first terminal from the first terminal group to connect the selected first terminal to the inductive element (col. 9, lines 46-52).

8. As to claim 13, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the selecting means is a multiplexor circuit including a plurality of analog switches (col. 9, lines 40-41).

9. As to claim 14, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the multiplexor further includes a switch for grounding an output of the terminal which is not selected (col. 6, lines 55-57).

10. As to claim 15, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the board includes a plurality of pattern wires formed thereon, the pattern wires each having first and second terminal groups, where the continuity inspection apparatus further includes selecting means for selecting the second terminal from the second terminal group to connect the selected second terminal to the second lead wire (col. 9, lines 36-37).

11. As to claim 16, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the selecting means is a multiplexor circuit including a plurality of analog switches (col. 9, lines 52-54).

12. As to claim 17, Crook discloses a continuity inspection apparatus and method for inspecting electrical continuity between first and second terminals of a pattern wire formed on a board, the continuity inspection substantially as claimed, comprising:

where the multiplexor further includes a switch for grounding an output of the terminal which is not selected (col. 6, lines 55-57).

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13. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crook in view of Buckles et al. (US Patent No. 6,027,500 and Buckles hereinafter).

14. As to claim 29, Crook discloses a continuity inspection apparatus for inspecting electrical continuity between first and second terminals of a pattern wire formed densely on a board substantially as claimed, the continuity inspection apparatus comprising:

a sensor electrode having a dimensional size so as to provide a coupling capacitance falling within the range of 50 fF to 1 PF with said pattern wire (col. 10, lines 65-68);

an inductive element connected in parallel or series with the sensor electrode, the inductive element having a constant ranging from 20 mH to 25pH;

an oscillator oscillating at a reference frequency falling within the range of 5 MHZ to 10 MHZ, the oscillator being adapted to change the frequency thereof in a given range from the reference frequency (col. 6, lines 2-5).

Crook did not expressly disclose:

an inductive element connected in parallel or series with the sensor electrode, the inductive element having a constant ranging from 20 mH to 25pH.

Nonetheless, these features are well known in the art and would have been an obvious modification of the system disclosed by Crook, as evidenced by Buckles.

In an analogous art, Buckles discloses an ablation system with patient interface for acquiring signals having:

an inductive element connected in parallel or series with the sensor electrode, the inductive element having a constant ranging from 20 mH to 25pH (col. 3, lines 56-58).

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Given the teaching Buckles, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Crook by employing the well known or conventional features of continuity measurements, such as disclosed by Buckles, in order generate a constant impedance over the entire frequency range of an interconnect to test for defects and for the purposes discussed above.

15. Claims 5, 11, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over crook in view of Chatterjee as applied to claim 1 above, and further in view of Indihar (US Patent No. 6,665,126 and Indihar hereinafter).

Although the combine teaching of Crook and Chatterjee shows substantial features of the claimed invention (discussed above), it fails to disclose:

where the capacitive coupling means includes a first flat plate electrode connected to the inductive element, the first flat plate electrode having a principal surface to be faced toward the first terminal so as to form a capacitance with the first terminal [claim 5] (La, Ea, Fig. 1; col. 5, lines 48-52) to provide for a strong electric field.

Where the inspection signal is a pulse signal [claims 11, 22] (col. 5, lines 44-45).

Given the teaching Indihar, a person having ordinary skill in the art at the time of the invention would have readily recognized the desirability and advantages of modifying Crook in view of Chatterjee by employing the well known or conventional features of a measuring device, such as disclosed by Indihar, in order to provide a voltage signal that corresponds to the measured capacitance change to test for defects and for the purposes discussed above.

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Prior Art Made of Record

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

a. Takada (US patent No. 6,201,398 B1) discloses a method and apparatus for inspecting pattern lines on a circuit board;

B. Keirn et al. (US Patent No. 5,696,451) discloses a method and apparatus for measuring pin open faults.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter Benson whose telephone number is (703) 306-4525 or (571) 272-2227 after 01/27/2004. The examiner can normally be reached on Mon to Fri 6:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Walter Benson *WB*
Patent Examiner

January 9, 2004


N. Le
Supervisory Patent Examiner
Technology Center 2800